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AUTHOR	Larson, Daro E.
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ABSTRACT

The language, intellectual, and social deficits of economically deprived children are the targets of a 4-year study designed to follow the educational progress of a group of deprived children from preschool through grade 3. This document reports on the preschool year, the first phase of the longitudinal study, which investigated whether or not there is a significant intelligence test score difference between (1) children who attended a 9-month Head Start program and children who were eligible but did not attend, (2) children who attended the program and children who were not eligible, and (3) children before they attended the program and the same children after the program. The subjects for the 3 groups in this study were 108 rural, 4-year-old children (48 male, 60 female). The Head Start intervention emphasized language development, concept learning, socialization, and psychomotor development. The intelligence test used was the 1960 Stanford-Binet Intelligence Scale. The children who attended the program scored significantly higher at posttest than at pretest and significantly higher than both groups who did not attend the Head Start program. (MH)

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THE EFFECT OF A PRESCHOOL EXPERIENCE UPON INTELLECTUAL FUNCTIONING AMONG FOUR-YEAR-OLD, WHITE CHILDREN IN RURAL MINNESOTA*

by
Daro E. Larson
Associate Professor
Special Education Department

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In recent years much attention has been given to preschool programs for children from lower socioeconomic homes in cities throughout the nation. A number of studies have been designed to measure the effect of early intervention upon intellectual functioning and related factors among selected segments of the population through analysis of data collected during pre- and post-program evaluations (Di Larenzo and Salter, 1968; Jensen, 1966; Rieber and Womack, 1968).

Generally noted in studies of children who are socially and economically disadvantaged not attending a preschool program is that there exists marked deficits. These deficits are found in areas of language development, intellectual functioning, and socialization skills when compared to middle class children at the time of school entrance. It has also been noted that observed deficits in skills among disadvantaged children at initial school entrance become greater as the school tasks become more demanding in the middle grades (Larson, 1966). Finally,

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disadvantaged children have made significant gains in intellectual functioning and related areas so that they more closely approximate the measured levels of middle class children following intervention at the preschool age.

This study was designed to extend over a period of four years in order to follow the educational progress of the children included in this sample from preschool through grade level three. In Phase I, reported below, data were collected at the beginning and end of the period usually designated as the pre-kindergarten year in order to establish baseline scores. In subsequent phases, academic progress of these children will be observed each year through analysis of data obtained from individual psychological tests, group achievement tests, and teacher evaluations.

The purpose of this study was to investigate the effect of a nine-month Headstart program upon the level of intellectual functioning among rural four-year-old children. More specifically, the following questions were asked.

1. Is there a significant difference between mean performances of children on an individual intelligence test who are eligible but not attending a Headstart program and mean performances of children attending a nine-month Headstart program?
2. Is there a significant difference between mean performances of children on an individual intelligence test who are not eligible to attend a Headstart program and mean performances of children who attend a nine-month Headstart program?
3. Is there a significant difference between mean performances of children on an individual intelligence test administered before and after they attend a nine-month Headstart program?

The subjects for this study consisted of 108 preschool age children (48 male, 60 female) with a mean chronological age of four years eight months residing in Brown County, Minnesota. The experimental group (Group X) was composed of 36 children, mean chronological age four years eight months, attending nine-month Headstart programs. The potential Headstart group (Group P) was composed of 36 children, mean chronological age four years eight months, drawn from a pool of 45 eligible candidates for Headstart, but not attending a Headstart or preschool program. Eligibility for subjects in Group P to attend Headstart was determined by a committee composed of an elementary school principal, a kindergarten teacher, a school social worker, and a school nurse. A completely random group (Group R) was composed of 36 children, mean chronological age four years eight months, drawn randomly from a pool of 132 children who were not enrolled in a preschool program. All subjects included in this study were eligible by chronological age to attend kindergarten classes during the fall of 1969.

The intervention provided by Headstart programs at three locations in Brown County was under the direction and supervision of the Headstart Programs Coordinator of the Minnesota Valley Action Council. Similar to public school terms, the Headstart programs began in September and ended in June. The program content emphasized:

1. Language development through use of Peabody Language Development Kits, tape recorders, show and tell, listening activities, etc.
2. Concept learning through relating concrete to abstract, similarities and differences, and use of selected materials for multi-sensory associations.

3. Socialization by participating in games, parties, free play, field trips to various community centers, etc.
4. Psychomotor development through selection of tasks involving gross and fine motor activities.

Since the intent of this phase of study was to investigate the immediate effect of a preschool experience upon the level of intellectual functioning, the 1960 Stanford-Binet Intelligence Scale was administered during the months of September and October of 1968. See Table 1. Data collected following intervention during the months of May and June, 1969, are reported in Tables 2, 3, and 4.

TABLE 1
PRE-SCHOOL CHILDREN STANFORD-BINET SCORES IN A RURAL MINNESOTA COUNTY IN SEPTEMBER AND OCTOBER OF 1968

Group	N	Pre-Test Means		
		C.A.	M.A.	I.Q.
X	36	4-8	4-7	98.56
P	36	4-8	5-1	107.92
R	36	4-8	5-3	109.30

TABLE 2
COMPARISON OF MEAN PERFORMANCES OF STANFORD-BINET SCORES
FOR GROUPS P AND X AT BEGINNING AND END OF
PRE-SCHOOL YEAR 1968-1969

	Group P (N=36)		Group X (N=36)			
	Mean I.Q.	SD	Mean I.Q.	SD	t	df
Pre-test	107.92	12.670	98.56	14.209	2.9505**	70
Post-test	109.25	11.010	108.58	15.104	.2140	70

0.05 = 2.00*
0.01 = 2.65**

TABLE 3
COMPARISON OF MEAN PERFORMANCES OF STANFORD-BINET SCORES
FOR GROUPS R AND X AT BEGINNING AND END OF
PRE-SCHOOL YEAR 1968-1969

	Group R (N=36)		Group X (N=36)			
	Mean I.Q.	SD	Mean I.Q.	SD	t	df
Pre-test	109.30	13.403	98.56	14.209	3.3020**	70
Post-test	109.28	11.057	108.58	15.104	.2225	70

0.05 = 2.00*
0.01 = 2.65**

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TABLE 4
SUMMARY OF PRE- AND POST-TEST FINDINGS AND MEAN DIFFERENCES IN STANFORD-BINET SCORES FOR ALL I.Q. SCORES WITHIN GROUPS AT BEGINNING AND END OF PRE-SCHOOL YEAR 1968-1969

Group	N	Pre-Test Mean I.Q.	Pre-Test SD	Post-Test Mean I.Q.	Post-Test SD	t	df
X	36	98.56	14.209	108.58	15.104	2.9013**	70
P	36	107.92	12.670	109.25	11.010	.4765	70
R	36	109.30	13.403	109.28	11.057	.0095	70

0.05 = 2.00*
0.01 = 2.65**

The results of the analysis of data gathered to answer the questions posed earlier are as follows:

1. A comparison of mean performances of children (Group P) eligible for Headstart (but not attending) and mean performances of children (Group X) enrolled in Headstart are shown in Table 2. Group P made mean gains of 1.23 I.Q. points; Group X made mean gains of 10.02 I.Q. points. The difference, 8.79 points, was significant beyond the 0.01 level.
2. Mean performances of children (Group R) randomly selected and mean performances of Group X are presented in Table 3. Group R showed mean loss of 0.02 I.Q. points, nonsignificant; Group X made mean gains of 10.02 I.Q. points. The difference of 10.00 points was significant beyond the 0.01 level.
3. Table 4 shows the gains in mean performances made by Group X. A mean I.Q. score of 98.56 was obtained on the pre-test. A mean

I.Q. score of 108.58 was reached on the post-test. The difference of 10.02 points was significant at the 0.01 level.

Randomly assigned groups of four-year-old children not enrolled in a preschool program and a group of four-year-old children enrolled in a Headstart program were compared at the beginning of the Headstart term. Differences in mean I.Q. scores of the randomly selected groups and the Headstart group were statistically significant. On data collected at the end of the Headstart term differences in mean I.Q. scores of the random groups and the Headstart group were found to be nonsignificant.

Conclusions and Implications

From the above findings, it is appropriate to draw the following conclusions:

1. Groups of four-year-old, white children residing in rural communities who do not attend a preschool program can seldom be expected to make significant gains in mean I.Q. scores.
2. Rural four-year-old children who attend a Headstart program as provided in Brown County make significant gains in mean I.Q. scores.
3. As a result of having attended a Headstart program, the level of intellectual functioning among four-year-old rural children increased to more closely approximate the level of randomly selected children who did not attend a preschool program.

Additional efforts at this point are needed which should include:

1. A continued evaluation through grade level three to observe the degree of stability of gains in intellectual functioning

made during the preschool experience by children who attended the Headstart program.

2. An analysis of performance on subtests of the Stanford-Binet at pre- and post-test levels to determine areas of specific gains in intellectual functioning.
3. A further analysis to determine if there exists significant differences in gains between boys and girls in performance at pre- and post-test levels.

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